MC100LVELT23

3.3V Dual Differential LVPECL to LVTTL Translator

The MC100LVELT23 is a dual differential LVPECL to LVTTL translator. Because LVPECL (Positive ECL) levels are used only +3.3 V and ground are required. The small outline 8-lead package and the dual gate design of the LVELT23 makes it ideal for applications which require the translation of a clock and a data signal.

The LVELT23 is available in only the ECL 100K standard. Since there are no LVPECL outputs or an external V_{BB} reference, the LVELT23 does not require both ECL standard versions. The LVPECL inputs are differential. Therefore, the MC100LVELT23 can accept any standard differential LVPECL input referenced from a V_{CC} of +3.3 V.

- 2.0 ns Typical Propagation Delay
- Maximum Frequency > 180 MHz
- Differential LVPECL Inputs
- PECL Mode Operating Range: V_{CC} = 3.0 V to 3.8 V with GND = 0 V
- 24 mA LVTTL Outputs
- Flow Through Pinouts
- Internal Pulldown and Pullup Resistors

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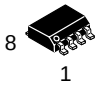
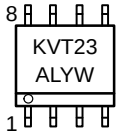
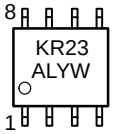
MARKING DIAGRAMS*



SO-8
D SUFFIX
CASE 751



TSSOP-8
DT SUFFIX
CASE 948R



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

Device	Package	Shipping**
MC100LVELT23D	SO-8	98 Units/Rail
MC100LVELT23DR2	SO-8	2500 Units/Reel
MC100LVELT23DT	TSSOP-8	98 Units/Rail
MC100LVELT23DTR2	TSSOP-8	2500 Units/Reel

†For additional tape and reel information, refer to Brochure BRD8011/D.

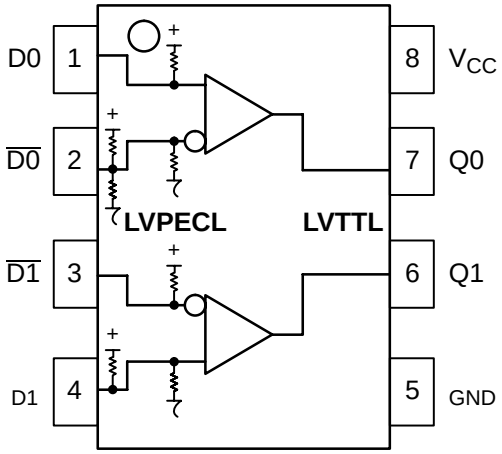


Figure 1. 8-Lead Pinout (Top View)
and Logic Diagram

PIN DESCRIPTION

PIN	FUNCTION
Qn	TTL Outputs
Dn, $\overline{Dn}$	PECL Differential Inputs
V_{CC}	Positive Supply
GND	Ground

ATTRIBUTES

Characteristics		Value
Internal Input Pulldown Resistor		75 KΩ
Internal Input Pullup Resistor		37.5 KΩ
ESD Protection	Human Body Model Machine Model	> 1.2 kV > 150 V
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)		Level 1
Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count		91
Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test		

1. ,Refer to Application Note AND8003/D for additional information.

MAXIMUM RATINGS (Note 2)

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V_{CC}	PECL Power Supply	GND = 0 V		3.8	V
V_I	Input Voltage	GND = 0 V, V_I not more positive than V_{CC}		3.8	V
I_{out}	Output Current	Continuous Surge		50 100	mA
T_A	Operating Temperature Range			-40 to +85	°C
T_{stg}	Storage Temperature			-65 to +150	°C
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	SO-8 SO-8	190 130	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SO-8	41 to 44 ± 5%	°C/W
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	TSSOP-8 TSSOP-8	185 140	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-8	41 to 44 ± 5%	°C/W
T_{sol}	Solder Temperature	< 2 to 3 Seconds: 245°C desired		265	°C

2. Maximum Ratings are those values beyond which damage to the device may occur.

LVPECL INPUT DC CHARACTERISTICS V_{CC} = 3.3 V; GND = 0 V (Note 3)

		-40 °C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
I_{CCH}	Power Supply Current (Outputs set to HIGH)	10	18	25	10	18	25	10	18	25	mA
I_{CCL}	Power Supply Current (Outputs set to LOW)	15	26	33	15	26	33	15	26	33	mA
V_{IH}	Input HIGH Voltage (Note 5)	2135		2420	2135		2420	2135		2420	mV
V_{IL}	Input LOW Voltage (Note 5)	1490		1825	1490		1825	1490		1825	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Notes 4 and 5)	2.0		3.3	2.0		3.3	2.0		3.3	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current $\frac{D}{\overline{D}}$	 -150		0.5	 -150		0.5	 -150		0.5	μA

NOTE: Circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.

3. All values vary 1:1 with V_{CC}. V_{CC} can vary ±0.3 V.
4. V_{IHCMR} min varies 1:1 with GND, max varies 1:1 with V_{CC}.
5. LVTTL output R_L = 500 Ω to GND.

LVTTL OUTPUT DC CHARACTERISTICS V_{CC} = 3.3 V; GND = 0V (Note 6)

Symbol	Characteristic	-40 °C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage (I_{OH} = -3.0 mA) (Note 7)	2.4			2.4			2.4			V
V_{OL}	Output LOW Voltage (I_{OL} = 24 mA) (Note 7)			0.5			0.5			0.5	V
I_{OS}	Output Short Circuit Current	-180		-50	-180		-50	-180		-50	mA

NOTE: Circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

6. All values vary 1:1 with V_{CC}. V_{CC} can vary ±0.3 V.
7. LVTTL output R_L = 500 Ω to GND.

AC CHARACTERISTICS V_{CC} = 3.3 V; GND = 0 V (Notes 8, 9)

Symbol	Characteristic	-40 °C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
F_{max}	Maximum Toggle Frequency (Note 10)	180			180			180			MHz
t_{PLH}, t_{PHL}	Propagation Delay to Output Differential	1.0	1.5	2.5	1.0	1.7	2.5	1.0	1.7	2.5	ns
t_{SK++} t_{SK--} t_{SKPP}	Output-to-Output Skew++ Output-to-Output Skew- - Part- to- Part Skew (Note 11)			60 25 500			60 25 500			60 25 500	ps
t_{JITTER}	Random Clock Jitter (RMS)		0.5			0.5			0.5		ps
V_{PP}	Input Voltage Swing (Differential) (Note 12)	200	800	1000	200	800	1000	200	800	1000	mV
t_r t_f	Output Rise/Fall Times (0.8 V - 2.0 V) Q, $\overline{Q}$	330	600	900	330	600	900	330	650	900	ps

8. All values vary 1:1 with V_{CC}. V_{CC} can vary ±0.3 V.
9. LVTTL output R_L = 500 Ω to GND and C_L = 20 pF to GND. Refer to Figure 2.
10. F_{max} guaranteed for functionality only. V_{OL} and V_{OH} levels are guaranteed at DC only.
11. Skews are measured between outputs under identical conditions.
12. 200 mV input guarantees full logic swing at the output.

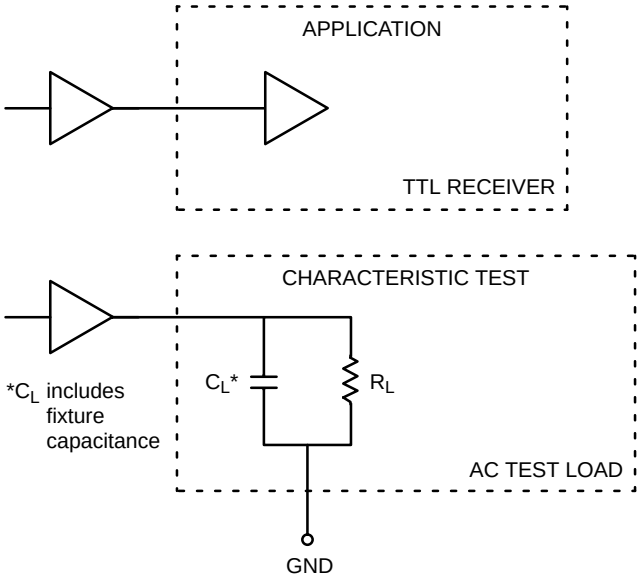


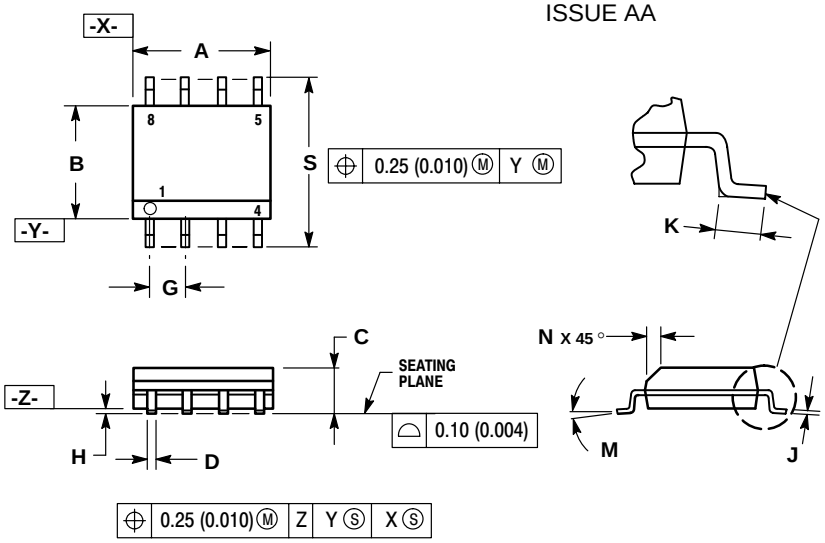
Figure 2. TTL Output Loading Used for Device Evaluation

Resource Reference of Application Notes

AN1404	-	ECLinPS Circuit Performance at Non-Standard V_{IH} Levels
AN1405	-	ECL Clock Distribution Techniques
AN1406	-	Designing with PECL (ECL at +5.0 V)
AN1503	-	ECLinPS I/O SPICE Modeling Kit
AN1504	-	Metastability and the ECLinPS Family
AN1560	-	Low Voltage ECLinPS SPICE Modeling Kit
AN1568	-	Interfacing Between LVDS and ECL
AN1596	-	ECLinPS Lite Translator ELT Family SPICE I/O Model Kit
AN1650	-	Using Wire-OR Ties in ECLinPS Designs
AN1672	-	The ECL Translator Guide
AND8001	-	Odd Number Counters Design
AND8002	-	Marking and Date Codes
AND8020	-	Termination of ECL Logic Devices
AND8090	-	AC Characteristics of ECL Devices

PACKAGE DIMENSIONS

SO-8
D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-07
ISSUE AA

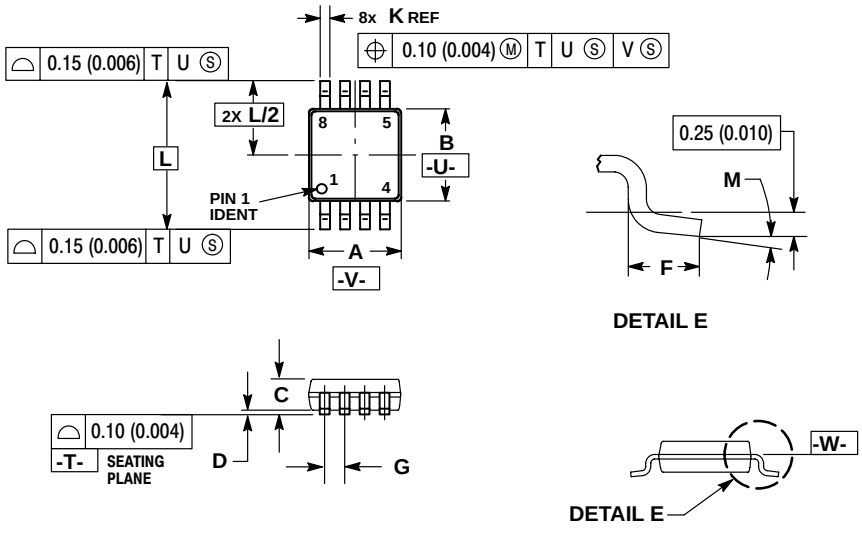


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751−01 THRU 751−06 ARE OBSOLETE. NEW STANDAARD IS 751−07

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

PACKAGE DIMENSIONS

TSSOP-8
DT SUFFIX
PLASTIC TSSOP PACKAGE
CASE 948R-02
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH. PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE –W–.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6°	0°	6°

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